DOCUMENT RESUME

ED 225 336 EC 150 693

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TITLE Semantic Analyses of Classroom Writing Behavior of the Deaf.
PUB DATE 25 Jun 82
NOTE 17p.; A condensed version of this paper was presented at the International Convention of the Alexander Graham Bell Association for the Deaf (Toronto, Canada, June 25, 1982).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Deafness; Hearing Impairments; High Schools; *Memory; *Reading Comprehension; *Recall (Psychology); *Semantics; Syntax; *Writing (Composition)

ABSTRACT

The ability of 20 deaf or hearing impaired high school students to demonstrate written recall of story propositions and correct story inferences from prose was examined and compared with 20 hearing students. Students were tested individually and were asked to read a story and then to rewrite it without looking at it. Premises in the recalled story were compared with premises of the original. The number of correct inferences was also calculated for each student. Deaf Ss did not exhibit significantly different recall for inferences than did hearing Ss. Hearing Ss did recall a significantly larger number of premises than deaf Ss, and both groups recalled significantly more premises than inferences from the story. Results suggested the need for helping deaf students to learn syntax. (CL)

SEMANTIC ANALYSES OF CLASSROOM WRITING BEHAVIOR OF THE DEAF

by

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A condensed version of this paper was presented at the International Convention of the Alexander Graham Bell Association for the Deaf, in Toronto, Ontario, Canada, as part of the Mini-seminar:"Deaf Students' Writing: Theoretical and Practical Considerations," on June 25, 1982

The author wishes to acknowledge the cooperation of the Albany-Schoharie-Schnectady County BOCES, particularly M. Blakely, M. Murphy, and S. Ohnmacht.

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Abstract

The writing problems of hearing-impaired students may be considered as larger "language" problems. Evidence from this study indicates that deaf students (ages 15-19) do not exhibit significantly different story recall for inferences than hearing students (ages 15-18) , although deaf students do exhibit poorer overall recall for story premises. This suggests that both groups of students are able to integrate semantic information and infer correct conclusions, similarly, in their writing. Psycholinguistic development of semantic rules and implications for teaching writing to the deaf are discussed.

SEMANTIC ANALYSES OF CLASSROOM WRITING BEHAVIOR OF THE DEAF[1]

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Over the years, many researchers have studied language processes in the deaf population. Weaknesses have been documented in many areas of syntactic development (e.g., Quigley, Wilbur, Power, Montanelli, & Steinkamp, 1976), reading development (e.g., Furth, 1966; Di Francesca, 1972;Trybus & Karchmer, 1977), and writing skills (e.g., Myklebust, 1964; Blackwell, Engen, Fischgrund & Zarcadoolas, 1978; Moores, 1982; Quigley & Kretschmer, 1982). Historically, the U.S. has devoted vast efforts and resources to the problem of teaching deaf children to read and write English. Today, as federal legislation, such as P.L. 94-142: The Education for All Handicapped Children Act (1975) and P.L. 95-561: The Basic Skills Improvement Act (1979), and the changing political-social trends in the U.S. have impacted in many areas of education, teachers, special educators, reading teachers, speech-language pathologists, and other specialists are working together to improve deaf students' compentencies in the basic language areas of reading and writing.

Deaf students, at all ages, depend on writing for at least the same reasons that hearing students do, i.e., academic achievement, answering test questions, filling out job applications, writing business and personal letters, etc. Additionally, deaf students are dependent upon writing for basics, such as communicating with the hearing world when their speech or signing is not understood, and using telecommunication systems (TTYs). Still, many deaf students leave school and

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[1] Presented at the International Convention of the Alexander Graham Bell Association for the Deaf, Toronto, Canada, June 25, 1982.

enter the job market with inadequate writing skills.

The quality of a deaf student's written language may be "the best single indicator of a deaf child's command of English structure" (Quigley, 1980, p.13). Quigley (1980) maintains that writing samples reflect the internal psycholinguistic system that children impose on standard English when reading or recalling it. Work with verbatim recall of written sentences (Sarachan-deily & Love, 1974; Sarachan-Deily, 1982) has indicated that the deaf do not use English syntactic rules to aid in their organization and written recall of sentences as well as hearing subjects do, but that deaf subjects do seem to be able to use semantic information and coding strategies when writing individual sentences in a manner similar to the hearing. Sarachan-Deily (1982) reported that deaf subjects were as likely to retain the "gist" of recalled written sentences as hearing subjects were, although deaf subjects' sentences were more likely to contain syntax errors. These studies involved verbatim recall, i.e., exact recall of the stimuli. Since everyday writing rarely involves verbatim recall of material, connected meaningful prose may be a more appropriate stimulus for studying deaf writing. Since the ability to extract, comprehend, and retain written information is so important to as deaf student, it was felt that exploring writing samples for semantic recall was an important area to study.

The information that people comprehend from written language is not limited to the information explicitly stated. Adults, as well as children, seem to remember the semantic relationships expresed by sentences rather than individual words or exact sentence structures (e.g., Bransford & Franks, 1971,1972; Paris & Carter, 1973; Paris & Upton, 1976, etc.). The "constructive" or inferential aspects of communication, i.e., our ability to use our knowledge of the world to go beyond literal meaning, is an important component of comprehension (Bransford & McCarrell, 1976). Although Brewer, Caccamise & Siple (1979) reported that

deaf adults do abstract and integrate the semantic content from individual sentences into wholistic semantic ideas in a manner similar to that for hearing people, these results were achieved using a small group of deaf adults (n = 9) and, to this author's knowledge, have not been replicated or extended to younger deaf subjects.

The purpose of the present study is to investigate deaf students' abilities to demonstrate written recall of story propositions and correct story inferences from prose, controlled for reading difficulty, and to compare deaf and hearing subjects' performance in these areas. Specifically the study was designed to provide data to help answer the following questions: (1) Are there differences between deaf and hearing subjects' written recall of story premises? (2) Are there differences between deaf and hearing subjects' use of inferences in their writing? (3) Do deaf and hearing students semantically integrate individual ideas not explicitly contained within the structure of individual sentences in a similar manner?

Method

Subjects

The sample was composed of forty high school students; twenty students had normal hearing and twenty students were classified by the school as "deaf" or "hearing-impaired." The twenty hearing students were randomly selected from the population of normally-hearing students in the "average" track, with no obvious handicapping conditions. These subjects consisted of 9 females and 11 males. The hearing-impaired students were randomly selected from the population of all students enrolled in the Board of Cooperative Educational Services (BOCES) Program for Hearing-Impaired Students, who returned a signed parental consent form. All hearing-impaired students were day students in a mainstreamed class for the hearing impaired and had no other handicapping conditions that complicated their deafness, and all the hearing-impaired students were judged by their teacher to

be capable of reading and writing the experimental task material. The twenty hearing-impaired students consisted of 14 females and 6 males. Additional information regarding chronological ages, intelligence quotients, and pure tone averages, for the subjects, is summarized in Table 1.

Table 1 here

Procedure

Hearing and Hearing-impaired students were tested separately. The hearing students were tested in their regular classrooms, by their classroom teacher, and the hearing-impaired students were tested in the resource room by their teacher of the deaf; with both groups, experimental sessions were conducted as a part of the regular school day. All students were instructed in the manner most similar to their usual communication mode, i.e., hearing students were instructed orally, with the teacher using normal conversational hand and face movements, and the hearing-impaired students were instructed in total communication. Additionally, both groups of students received identical written instructions.

Each student was handed a booklet containing a statement about the purpose of the study, written directions for the experimental task, a typed copy of the story, three pieces of lined, canary-colored paper (8 1/2" x 11"), and three pieces of lined white paper (8 1/2" x 11"). All students were informed that the same materials were being given to both deaf and haring students. The procedure took approximately 15-20 minutes for hearing students and approximately 25 minutes for the hearing-impaired students.

Materials

A simple children's story, "Lost in Alaska" (Potter, 1978), designed for teenage interest level and fourth grade reading level, was adapted for this study.

The story was examined by the author and by a certified teacher of the deaf to rule out and eliminate any unusual or potentially misleading idioms, vocabulary, or sentence constructions. The resulting, adapted story is 377 words, 50 sentences, and 5 paragraphs in length. It has 47 distinct premises, which can be combined or used singly to yield at least 23 specific inferences from the text. The adapted story was retyped on plain white paper, using an IBM Letter Gothic typewriter element, to avoid giving clues about the story's reading level to the students. The story concerns a female airplane pilot whose instruments fail when she is caught in a thunderstorm, in Alaska, and she is forced to use her parachute and jump. Information affording avariety of inferences about the pilot's feelings, her safety, the changing weather, and her actions were intentionally integrated into the text of the story in such a way that these did not disrupt the logic or structure of the story.

Instructions

The students were told:

> "Read the following story carefully and try to remember what happens, because you will have to retell the story later, in your own words, without looking back at the story."

The students were given an oppotunity to read the story, and then were instructed, again:

> "Now, rewrite the story in your own words, as best as you can remember it. The yellow sheets of paper should be used to write your rough draft. Rewrite the story so that someone who did not read it will know what the story is about. Write down all that you remember--it's OK to guess if your're not sure, but, please do not look back at the story! After you finish your rough draft, you may look it over, and fix any mistakes you can see.
>
> "Then, copy over your rough copy onto the white paper, writing it as best as you can, for a final copy.
>
> "If you have any questions, raise your hand and ask your teacher before you begin. If you have no questions, turn the page and start writing."

Reading this second set of directions usually resulted in a 1 - 2 minute delay

for most students, before they began writing the story. The students were given unlimited time to write the story.

Results

Each recall protocol was individually scored by the author and by one additional trained judge who was unbiased and unfamiliar with the purpose of the study. First, the number of story premises and inferences recalled by the subject was examined. For this analysis, the premises in the recalled story were compared with the premises of the original story, and the total number of premises accurately recalled by each student was determined. A premise was considered to be accurately recalled when there was a match in semantic content between the story and the recall protocol. There did not have to be verbatim recall or correct syntax for a premise to be credited; only the informational content had to be the same. Premises recalled with major distortions, inaccuracies, or erroneous elaborations with respect to content were omitted from this analysis. The interrater reliability coefficient (Scott, 1955) for story premises was r = .94.

The number of correct inferences made was also calculated for each student. Each recalled story was reexamined for the presence of correct inferences, that is, accurate (re)statements of information, generally from several input propositionss, that was not explicity stated in the story. For example, for the following input propositions, (a)"her hand on the control was tense,"and, (b) "her fingernails were white,"several students correctly made the inference, "She held the control so tight (sic) her fingernails were white." As with premises, inferences that did not maintain the gist of the stoyr were not included in this analysis. The interrater reliabilty coefficient for story inferences was r = .91.

The means and standard deviations of the numbers of premises and inferences recalled by both groups of subjects are summarized in Table 2. A 2 (deaf vs.

Table 2 here

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hearing) x 2 (premises vs. inferences) factorial analysis of variance, with repeated measures (BMDP2V, Dixon, 1967) on the between subjects' factor of hearing status was performed on the numbers of premises and inferences correctly recalled. The ANOVA showed a significant main effect for hearing status, with the hearing subjects performing better than the deaf subjects, $F(1,38) = 8.88$, $p < .005$. The main effect of recall was also significant, with more premises than inferences being recalled by both populations $F(1,38) = 117.28$, $p < .001$. The one-way interaction between these two factors was not significant. Post hoc analyses with the Newman-Keuls' Multiple Range test for pair-wise comparisons were performed. These results are summarized in Table 3. The post hoc comparisons of interest

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Table 3 here

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for this study revealed that both deaf and hearing students recalled significantly more premises than inferences ($p < .01$), that there were more premises recalled by the deaf subjects than there were inferences recalled by the hearing subjects ($p < .01$), and that the hearing subjects recalled more premises than did the deaf subjects ($p < .05$). Interestingly, there was no significant difference between the number of inferences correctly recalled by the deaf and hearing subjects.

Discussion

Although the findings for the sample in this study cannot be conclusive without replication, the data and theoretical implications are significant. The deaf students in this study did not exhibit significantly different recall for inferences from the story than the hearing subjects. This suggests that both groups of subjects are able to comprehend, retain, and recall semantic story

information that is implied. Clearly deaf students have the ability to integrate semantic information and infer correct conclusions, intheir writing. The scoring disregarded syntactic and spelling errors from both groups and concentrated solely on the semantic content of the students' writing.

As suspected, the hearing students recalled a significantly larger number of premises than the deaf students, and both groups of subjects recalled significantly more premises than inferences from the story. Implicitly stated premise information appears to be easeir to code and retain than inferential content for both groups of subjects. Deaf children did exhibit poorer recall for stories than normally hearing students. It is possible that the deaf have less effective memory strategies for premise recall. Although their strategies might involve using knowledge of story structure to recognize and encode the most important story information, they may not enable them to develop a systematic plan for retrieval of other semantic information to use in paraphrased written paragraphs.

When the material is easy enough to process linguistically, the deaf students seem to base their memory and written recall of the material on a semantic representation of various ideas abstracted from the information, as hearing subjects do. However, in so doing, the hearing subjects seem to retain much more of the additional specific premise informatioan than the deaf subjects. As the reading comprehension problems of deaf students may reflect a linguistic mismatch between their syntactic rule system and that of the printed text (Sarachan-Deily, 1982), the deaf students may develop constructive strategies to relate the semantic content of prose to their own psycholinguistic and world knowledge. Premise content that is unusual, new, or unrelated may be forgotten. Gormley (1981, 1982) found that familiarity with selection content facilitated later text recall for deaf students. Presumably readers can more easily comprehend meaning when they have more background, "schemata", or "world knowledge" about

topic to help them interpret the text.

The writing problems of hearing-impaired students are frequently considered as larger "language" problems. Writing, as well as speaking, listening, and reading involves certain psycholinguistic processes. Deaf students' writing typically contains many errors in English,and teachers of the deaf spend much time teaching rules of English to their students. What is surprising is that deaf subjects can make semantic inferences and paraphrases similar to the hearing students. When deaf subjects forget exact sentences, they do not randomly guess at the content, rather they base their paraphrase on semantic description, similar to the hearing subjects. It is necessary to concentrate on these aspects of meaning when teaching reading comprehnsion and writing skills; however, in the later grades, it seems necessary to return to teaching the basic rules of English syntax. The directions to "do your best", the opportunity to do, review, and correct a rough draft, and allowing each subject to reflect upon the writing and correct observed errors was not sufficient to avoid the many syntax errors observed in these writing protocols. Perhaps more students should be encouraged to produce and examine drafts for syntax errors as well as content errors, rather thatn assuming the teen years are too late to teach syntax. The inferencing abilities and memory for gist in the deaf seems to be adequate and similar to the hearing subjects. But even high school deaf students do not have sufficient control of English syntax, and we still need to continue to help these students to acquire it.

References

Blackwell, P.M., Engen, E. Fischgrund, J.E., Zarcadoolas, C. Sentences and other systems: A language and learning curriculum for hearing-impaired children. Washington, D.C : A.G. Bell Association for the Deaf, 1978.

Bransford, J.D. & Franks, J.J. The abstraction of linguistic ideas. Cognitive Psychology, 1971, 2, 331-350.

Bransford, J.D. & Franks, J.J. The abstraction of linguistic ideas: A review. Cognition, 1972, 1, 211-249.

Bransford, J.D & Mc Carrell, N.S. A sketch of a cognitive approash to comprehension: Some thoughts about understanding what it means to comprehend. In W.B. Weimer & S.D Palermo (Eds.) Cognition and the symbolic processes. Hillsdale, N.J.: Erlbaum, 1974.

Brewer, L. Caccamise, F. & Siple, P. Semantic integration in the adult deaf. Directions, 1979, 1, 15-24.

Di Francesca, S. Academic achievement test results of a national testing program for hearing-impaired students:United States, Spring, 1971. Washington, D.C.: Gallaudet College, Office of Demographic Studies, 1972.

Furth, H.G. A comparison of reading test norms of deaf and hearing children. American Annals of the Deaf, 1966, 111, 461-462.

Gormley, K.A. On the influence of familiarity on deaf students' text recall. American Annals of the Deaf, 1981, 126, 1024-1030.

Gormley, K.A The importance of familiarity in hearing-impaired readers' comprehension of text. Volta Review, 1982, 71-80.

Moores, D.F. Educating the deaf:Psychology, principles & practices, 2nd Ed. Boston: Houghton Mifflin Co., 1982.

Myklebust, H.R. The psychology of deafness. Sensory deprivation, learning, and adjustment, 2nd Ed. N.Y.: Grune& Stratton, 1964.

Paris, S.G & Carter, A.Y. Semantic and constructive aspects of sentence memory in children. Developmental Psychology, 1973, 9, 109-113

Paris, S.G. & Upton, L.R. Children's memory for inferential relationships in prose. Child Development, 1976, 47, 660-668.

Potter, R.R. Lost in Alaska In Making Inferences Book 3 N.Y. Globe Book Co. Inc., 1978.

Quigley, S.P. Effect of hearing impairment on reading development In H.M.Reynolds and C.M. Williams Proceedings of the Gallaudet conference on reading in in relation to deafness. May 25, 1978--Gallaudet College. Washington, D.C.. Gallaudet College, 1980.

Quigley, S.P. & Kretschmer, R.E. The education of deaf children: Issues, theory, & Practice. Md: University Park Press, 1982.

Quigley, S.P., Wilbur, R.B., Power, D.J., Montanelli, D.S. & Steinkamp, M.W. Syntactic structures in the language of deaf children. Illinois: Inst. for Child Behavior and Development, U. of Illinois at Urbana-Champaign, 1976.

Sarachan-Deily, A.B. & Love, R.J. Psycholingistic competence in the deaf. Journal of Speech and Hearing Research, 1974, 17, 689-699.

Sarachan-Deily, A.B. Hearing-impaired and hearing readers' sentence processing errors. Volta Review, 1982, 84, 81-95.

Trybus, R. & Karchmer, M. School achievement scores of hearing impaired children: National data on achievement status and growth patterns. American Annals of the Deaf, 1977, 122, 62-69.

Table 1

Means and Standard Deviations for Subjects' Chronological Ages, Intelligence Quotients, and Average Hearing Loss

Measure	Summary Statistics		
	n	$\bar{X}$	S.D.
Age			
Deaf	20	17.23	.76*
Hearing	20	16.12	.51
I.Q.			
Deaf[a]	10	104.13	17.18
Hearing[b]	20	104.82	10.93
Average Hearing Loss[c]			
Deaf	20	87.85	17.96

[a]WISC-R I.Q.

[b]California Achievement Test Language I.Q.

[c]Pure Tone Average (better ear) at 250, 500, 1000, 2000 Hz

*$p < .001$

Table 2

Means and Standard Deviations for Numbers of Premises and Inferences Recalled by Both Groups of Subjects

	Recall**	
Group*	Premises	Inferences
Deaf		
Mean	13.85	4.45
S.D.	6.17	1.98
Hearing		
Mean	17.55	6.85
S.D.	5.51	2.00

* $F(1,38) = 8.88$, $p = .005$

** $F(1,38) = 117.28$, $p < .001$

Table 3

Summary of Newman-Keuls Multiple Range Test, on Mean-Differences, for 2 (Deaf/Hearing) x 2 (Premise/Inference) ANOVA

	$\bar{X}$--Deaf Inf. = 4.45	$\bar{X}$--Hearing Inf. = 6.85	$\bar{X}$--Deaf Prem = 13.85	$\bar{X}$ -Hearing Prem = 17.55
$\bar{X}$--Deaf Inferences = 4.45	---	2.40	9.40**	13.10**
$\bar{X}$--Hearing Inferences = 6.85		---	7.00**	10.70**
$\bar{X}$--Deaf Premises = 13.85			---	3.70*
$\bar{X}$--Hearing Premises = 17.55				---

* $p < .05$

** $p < .01$